

# A Constraint-Based Approach to Alternative Questions in English\*

Eun-Jung Yoo

## 1. Introduction

Questions can be classified into three types according to the kind of reply they elicit, polar questions (or yes-no questions), *wh*-questions, and alternative questions. Compared to other types of questions, alternative questions have not received as much attention. It is perhaps because the relationship between alternative questions and the other two types of questions is often not very clear; furthermore, an analysis of alternative questions usually requires dealing with various syntactic and semantic issues, such as disjunction, coordination, syntax and semantics of interrogatives, and treatment of *whether* and *if*.

In this paper, we deal with English alternative questions such as (1) within the framework of Head-Driven Phrase Structure Grammar (HPSG).

(1) Did Mary buy books or video tapes?

There are two issues to focus on regarding the analysis of (1). First, it should be explained how the alternative question interpretation of (1) is obtained. Some previous semantic analyses assume that the interpretation of (1) involves a semantic version of conjunction reduction, with its denotation corresponding to a set of propositions (Karttunen 1977, Groenendijk & Stokhof 1982, Roberts 1996). On the other hand, there can be other semantic mechanisms that yield wide scope of disjunction in (1). In this paper, I will pursue an approach that posits a disjunction operator associated with *or*.

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Second, the syntactic representation of (1) should be determined in conjunction with its semantic interpretation. After examining two possible syntactic analyses, one involving movement of disjunction scope indicator, and the other employing syntactic reduction process, I will claim that (1) can be analyzed without assuming either movement or a reduction process. In the analysis to be proposed, (1) simply involves coordination of noun phrases. With the base-generated disjunction in syntax, I will present an analysis where alternative question interpretation is obtained by scoping of a disjunction operator originating from *or*.

In section 2, I will discuss some basic properties of alternative questions. Firstly, it is pointed out that an analysis of alternative questions should explain the fact that questions like (1) may receive a polar question interpretation as well as an alternative question interpretation. Secondly, it is argued that another type of alternative questions, which contains coordination of two sentences, should be analyzed as disjoined polar questions, not as true alternative questions. Section 3 deals with the semantic and syntactic behaviors of disjoined phrases in alternative questions. Based on Rooth & Partee (1982), I will show that the alternative question interpretation is related to the wide scope reading of *or*. Moreover, as mentioned above, I will argue that alternative questions like (1) can be simply analyzed as involving coordinated NPs. In section 4, I propose an analysis of alternative questions within HPSG. I will show that in the type hierarchy, alternative questions can be represented as a clause type, whose semantic representation is distinguished from that of other clause types by an alternative operator. The ambiguity of alternative questions noted above is accounted for by the optional nature of the disjunction operator. When the operator does not arise in *or*, the question at hand will receive a polar question interpretation. Our analysis is equally applicable to embedded alternative questions. In particular, section 4 discusses the status of the introducing words *whether* and *if*, and claims that their presence should be restricted by the matrix verbs.

## 2. Alternative Questions and Polar Questions

An alternative question presents two or more options for the reply. It can be used as an indirect question introduced by *whether* or *if*, manifesting the same syntactic behavior as a polar question:

- (2) Bill asked Sandy whether she wanted Coke or iced tea.
- (3) a. Did Sandy want coffee?  
b. Bill asked Sandy whether she wanted coffee.

Before we proceed, a terminological comment is in order. Cases like (3) have traditionally been called 'yes-no questions'. In this paper, however, I retain the term 'polar questions' to focus on the semantic aspect of the questions, which inquires the truth condition on a polarity scale. When the syntactic aspect involving formal processes such as subject auxiliary inversion or use of complementizers *whether* or *if* is at issue, I will use the term 'yes-no interrogatives'.

It is well known that yes-no interrogatives such as (2) are ambiguous between two interpretations, polar question interpretation and alternative question interpretation. When it is interpreted as a polar question, what Bill asked Sandy is whether or not she wanted one of the two drinks. In this case, Bill is indifferent as to which of the two drinks Sandy wants. When it is interpreted as an alternative question, what Bill asked is whether Sandy wanted Coke or Sandy wanted iced tea. In actual utterance, different intonations disambiguate the two readings.

There is another type of alternative questions in (4):

- (4) a. Is Sandy still at home or did she already leave for the party?  
b. Bill asked me whether Sandy was still at home or she had already left for the party.

Unlike (2), two sentences are coordinated in (4). Following Ginzburg (1992), we will treat cases like (4) as disjoined polar questions. In other words, each disjunct in (4) is a polar question and is connected by *or* to form a coordinated sentence. In this case, the disjunction is construed as a choice between two questions.<sup>1</sup> Thus in the response, it is sufficient to reply to one disjunct. We will not focus on examples such as (4), since their syntactic analyses will involve nothing more than disjunction of polar questions.

Karttunen (1977) argues that polar questions such as (3a) can be considered as 'degenerate' alternative questions, thus claiming that the indirect

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<sup>1</sup> Following Ginzburg, I suggest that such interpretation of disjoined questions is caused by a conversational implicature carried by disjunction that exactly one of the disjunct holds, but not both.

polar question in (3b) is an alternative question, *whether Sandy likes coffee or Sandy doesn't like coffee*. Accordingly, the indirect question in (3b) is analyzed as denoting the set of the propositions in (5):

- (5) {Sandy likes coffee, Sandy does not like coffee}

In Karttunen, this is analogous to the denotation of the indirect alternative question in (2), namely the disjunctively specified set of propositions in (6):

- (6) {Sandy wants Coke, Sandy wants iced tea}

While our analysis does not directly draw on Karttunen's semantic analysis of polar questions and alternative questions, it shares the intuition behind his analysis: that both of them involve choice between propositions (or entities). As we will see in section 4.1, we assume that there is a common mode 'choice', by which both types of questions are interpreted.

### 3. Scoping of *or* and the Syntax of Alternative Questions

#### 3.1. *Or*

As we saw in (1) and (2), alternative questions contain the conjunction *or*, and the semantics of disjunction is closely related to the alternative question interpretation. In this section, we will briefly look at the properties of disjoined phrases that are relevant in the discussion of alternative questions.

Rooth & Partee (1982) observe interesting facts regarding the interpretation of disjunction in English and argues that *or* bears scopal properties. The properties of *or* as a scope-bearing element are shown in the following example (Rooth & Partee's (13); See also Larson 1985 for the discussion of the example):

- (7) Mary is looking for a maid or a cook.

Example (7) is three-way ambiguous. The first reading is a *de dicto* reading of the conjoined phrase, in which Mary is searching for a servant and would end the search if she finds *x* that meets the description, *x* is a maid or *x* is a cook. The second reading is a *de re* reading, where there is some particular individual *x* who is either a maid or a cook such that Mary is

seeking *x*. The third reading, which is referred to as the ‘wide scope *or*’ reading in Rooth & Partee, involves ‘disjunction reduction’ interpretation, and can be paraphrased as ‘either Mary is looking for an individual *x* meeting the description of being a maid or else she is looking for an individual *x* meeting the description of being a cook’. The wide scope reading of *or* also appears when *or*-disjunction is contained in the complement of control verbs such as *want* (cf. Schwarz 1999):

(8) John wanted to eat rice or beans.

Example (8) is ambiguous depending on the scope of *or* with respect to the embedding verb *want*. If *or* takes narrow scope in (8), John would be indifferent as to whether he would end up with eating rice or eating beans. On the other hand, in the wide scope reading of *or*, the sentence is true if John wants to eat rice or John wants to eat beans. In this case, it is typically indicated that the speaker of the sentence does not know which of the two foods John wanted to eat.

So far, we have seen that *or* bears scopal properties, and that wide scope of *or* results in an interpretation containing disjunction of two propositions. We presume that *or* of alternative questions has the same property, and that such scopal nature of *or* is responsible for the alternative question readings of (1) and (2).

### 3.2. Syntactic Representations of Alternative Questions

This section briefly reviews two possible analyses of the syntax of alternative questions that may account for wide scope reading of disjunction: a movement analysis and a ‘gapping’ analysis. Based on Schwarz’s (1999), I will show that neither of these approaches is appropriate, and then propose that alternative questions like (1) and (2) do not involve syntactic processes such as movement or gapping. Disjunction in (1) and (2) will be simply treated by the coordination of NPs in its syntactic representation.

Larson (1985) proposes a movement analysis of disjunction. He observes that wide scope reading of disjunction discussed in 3.1 can be obtained by the sentence initial *either*. For example, while (9a) is still three-way ambiguous, (9b) lacks *de dicto* reading.

(9) a. Mary is looking for either a maid or a cook.

b. Either Mary is looking for a maid or a cook.

The same pattern holds for examples with control verbs. In contrast to (10a), which is ambiguous, example (10b) wherein *either* is placed in the sentence-initial position, the ambiguity disappears. Thus (10b) has only the wide scope reading of *or*:

- (10) a. John wanted to eat either rice or beans.  
       b. Either John wanted to eat rice or beans.

Larson argues that the DS (deep structure) position of *either* in (9b) and (10b) is adjacent to the disjoined phrase, as in (9a) and (10a). When *either* is moved to the clause-initial position, as in (9b) and (10b), unbalanced *either/or* disjunction occurs.<sup>2</sup> Under this assumption, he argues:

“When *either* occurs displaced from its associated *or*, then its overt surface syntactic position explicitly ‘marks’ the scope of disjunction. On the other hand, when it occurs undisplaced and adjacent to its disjunction in surface form, then its potential surface positions delimit the potential scope of *or*” (Larson 1985 : 224–225).

To implement this generalization, Larson proposes that *either* may undergo SS- or LF-movement, and the LF position of *either* marks the scope of disjunction.

Larson further proposes that the surface syntax of alternative questions is very similar to that of unbalanced *either/or* disjunction in (9b) and (10b). He argues that this view is supported by the fact that historically, *whether* is developed as the ‘*wh*-counterpart’ of *either*, with the original meaning, which of either A or B. According to him, *whether* of the alternative questions is moved from its underlying position that is adjacent to the disjoined phrase to the clause-initial position (i.e. a COMP position in Larson’s analysis).

- (11) a. Bill wonders Sandy likes whether [cookies or jelly] (DS)  
       b. Bill wonders whether<sub>i</sub> Sandy likes t<sub>i</sub> [cookies or jelly] (SS)

Since *whether* is now placed in the clause-initial position, it invokes the wide scope reading that gives rise to the alternative question interpretation.

This movement analysis is criticized by Schwarz (1999). Schwarz points out that the movement theory does not apply to the examples in (12) in the

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<sup>2</sup> Larson uses the term ‘unbalanced disjunction’ to indicate cases where two constituents joined by the two-part conjunction *either... or...* are not parallel.

desired way. Larson's theory predicts that the sentences in (12) are derived from their sources (13) without any problem, since there is no island or finite clause that blocks *either*-movement. However, examples (12a-c) are degraded contrary to Larson's prediction. Since sources of (12a-c) are well-formed, this poses a problem with the movement account.

- (12) a. ??Either this pissed Bill or Sue off.  
       b. ??Either she turned the test or the homework in.  
       c. ??Either they locked you or me up.
- (13) a. This pissed either Bill or Sue off.  
       b. She turned either the test or the homework in.  
       c. They locked either you or me up.

If *either* does not move, then Larson's approach capitalizing on the movement of *whether* loses its motivation.

While Schwarz's criticism focuses on *either* movement, there are some further problems that we can find with *whether* movement analysis. Consider the following sentence:

- (14) a. Susan asked them whether they wanted meat or fish.  
       b. Susan asked them if they wanted meat or fish.

Larson argues that the element *if* in (14b), which introduces an alternative question, is not plausibly analyzed as a scopal indicator on a par with *either* or *whether*, since *if* has no morphological or historical connection with disjunction. He claims that *if* in (14b) is simply a base-generated complementizer, and that the wide scope *or* reading is obtained not by the movement of *if*, but by the movement of the null (scopal) indicator O. Thus the  $\bar{S}$  complements of (14) are represented in (15):

- (15) a. [ $\bar{S}$  [<sub>COMP</sub> *whether*<sub>i</sub> [+WH]] [<sub>S</sub> they like [<sub>NP</sub> *t<sub>i</sub>* meat or fish]]]  
       b. [ $\bar{S}$  [<sub>COMP</sub> O<sub>i</sub> if ] [<sub>S</sub> they like [<sub>NP</sub> *t<sub>i</sub>* meat or fish]]]

The null indicator O is also posited in matrix alternative questions such as 'Do they like meat or fish?' in order to account for the wide scope of *or*.

The use of O, however, is not fully motivated. In particular, it is not clear why disjunction in English always needs a syntactic scopal indicator, while other scopal elements such as quantifiers and negation do not. If we have a way to account for the wide scope reading of *or*, without treating

*whether* as a scope indicator, we would not need to posit a null element *O*.

Even when we follow Larson's employment of *O*, other difficulties arise. As mentioned earlier, yes-no interrogatives are ambiguous between the polar question reading and the alternative question reading, depending on whether disjunction takes narrow or wide scope. When disjunction takes narrow scope, a problem arises with the view that *whether* is a scopal indicator, since this view will only yield wide scope reading for *or*. In order to explain this, Larson assumes that there is an alternative way to derive examples like (14a). In addition to (16a) which involves *whether* arising in the disjoined phrase, he proposes another structure (16b) where *whether* originates from a hidden *or not* disjunction:

- (16) a. [<sub>S</sub> [<sub>COMP</sub> *whether*<sub>i</sub>] [<sub>S</sub> they like [<sub>NP</sub> *t<sub>i</sub>* meat or fish]]]  
 b. [<sub>S</sub> [<sub>COMP</sub> *whether*<sub>i</sub>] [<sub>S</sub> [<sub>CONJ</sub> *t<sub>i</sub>* or not] [<sub>S</sub> *O<sub>j</sub>* [<sub>S</sub> they like [<sub>NP</sub> *t<sub>j</sub>* meat or fish]]]]]

In (16b), *whether* is moved from the S-initial conjunctive element *whether or not*, where the latter phrase *or not* may not be realized in the surface form. Moreover, the overt *or* within the NP has its own scope indicator, which adjoins to S. In the configuration (16b), the overt *or* takes only narrow scope.

When we consider the structures (15b) and (16b), we find another problem regarding the nature of null *O* movement. The nature of *O* movement is not clear at all; while (15b) contains movement to COMP, (16b) contains adjunction to S.

Furthermore, it is questionable that one of the underlying structures of (14a) should contain the hidden element *or not*. Positing this hidden element is more problematic in the explanation of narrow scope reading of (14b), namely (17), because unlike *whether*, *if* is not directly followed by *or not* in the surface form.

- (17) [<sub>S</sub> [<sub>COMP</sub> *O<sub>i</sub>* if] [<sub>S</sub> [<sub>CONJ</sub> *t<sub>i</sub>* or not] [<sub>S</sub> *O<sub>j</sub>* [<sub>S</sub> they like [<sub>NP</sub> *t<sub>j</sub>* meat or fish]]]]]

- (18) \*He didn't asked if or not they like meat.

Based on the problems with *either/whether* movement that we have discussed so far, I conclude that it is worth looking for the account of alternative questions.

Now we will briefly examine the second possible syntactic analysis of alternative questions, i.e. the 'reduction' account. Schwarz (1999) proposes that *either/or* unbalanced disjunction (such as (10b)) is best analyzed as the



result of a syntactic reduction process. Schwarz argues that the reduction process manifested in *either/or* disjunction can be identified with what Ross (1970) calls 'gapping'. When gapping occurs, the 'gap' must include the finite verb in the second conjunct, as in (19a). In many cases, it contains other elements plus the verb, as in (19b,c).<sup>3</sup>

- (19) a. Tom ate beans and others ~~ate rice~~.
- b. Jack begged Mary to get married and Bill ~~begged Lisa to get married~~.
- c. On Monday I bought a car and on Tuesday ~~I bought a motorcycle~~.

According to Schwarz, this general strategy of gapping is also operative in unbalanced disjunction.

- (20) a. Either John has seen Harry or Bill ~~has seen Sue~~.
- b. Either [this pissed Bill off] or [~~this pissed Sue off~~].

Moreover, Schwarz shows that unbalanced *either/or* disjunction is subject to the same restrictions as gapping. For example, unbalanced disjunction observes a parallelism constraint on the coordinates for gapping. When gapping occurs, parallelism is required between the first and the second coordinates. Accordingly, the unacceptability of (21b) is accounted for by lack of such parallelism.

- (21) a. [Some talked with you about politics] and [others talked with me about music].
- b. \*[Some talked about politics] and [others ~~talked~~ with me about music].

Schwarz claims the degraded examples in (12) should be explained in the same way.

- (22) a. ??Either [this pissed Bill] or [~~this pissed Sue off~~].
- b. ??Either [she turned the test] or [~~she turned the homework in~~].
- c. ??Either [they locked you] or [~~they locked me up~~].

Each sentence in (22) includes limping disjunction, which violates the

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<sup>3</sup> The term 'gap' refers to the elided material in the second coordinate.

parallelism constraint.

So far we have examined Schwarz's proposal that unbalanced *either/or* disjunction involves syntactic reduction. Now, would the same account be applicable to disjunction in alternative questions? Schwarz suggests that the answer is negative. This is because alternative questions do not follow the same kind of restrictions as gapping. According to him, while sentences in (12) or (22) are degraded, the corresponding alternative questions in (23) are grammatical.

- (23) a. I wonder whether this pissed Bill or Sue off.  
       b. I wonder whether they locked you or me up.  
       c. I wonder whether she turned the test or the homework in.

To summarize, Schwarz shows that alternative questions exhibit different syntactic properties from unbalanced *either/or* disjunction, and leaves it an open question how the interpretation of alternative questions is syntactically represented.

Following Schwarz, I assume that what is responsible for the syntax of alternative questions in (2) is not gapping. I propose that the disjoined NPs in (2) are simply the result of NP coordination via the conjunction *or*. As will be shown in the next section, the wide scope of disjunction will be explained by a theory of scope that is based on Cooper's (1983) quantifier storage technique.

#### 4. Representation of Alternative Questions

In section 2, we discussed two types of alternative questions:

- (24) Bill wonders whether Mary left or she stayed home.  
       (25) Bill wonders whether Sandy likes cookies or jellies.

I suggested that an example like (24) is analyzed as a disjoined polar questions.<sup>4</sup> Meanwhile, we saw that alternative questions such as (25) are

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<sup>4</sup> We assume that when two VPs are disjoined as in (i) and (ii), there is a missing subject in the second conjunct, following Schwarz in his analysis of (ii):

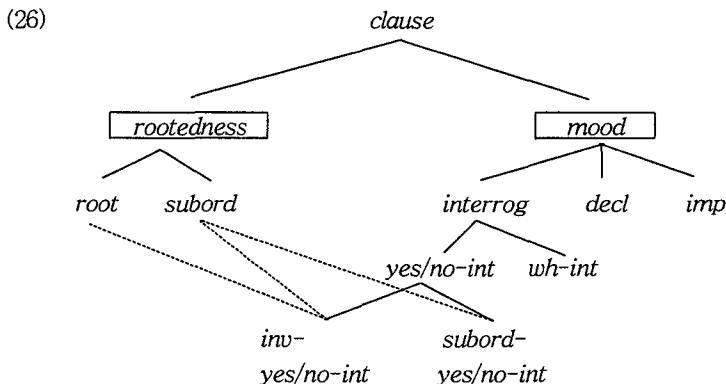
- (i) I wonder whether John stole your hat or took it thinking it was his.  
       (ii) Either someone stole your hat or took it thinking it was his.

hard to analyze as being reduced from two disjoined sentences. In what follows, we discuss how alternative questions are represented within the framework of Head-Driven Phrase Structure Grammar (HPSG).

#### 4.1. Representation of Questions

In order to capture the relationship between syntax and semantics, we will employ a type hierarchy of clauses. While clause types can be treated as one dimension of a phrasal type hierarchy (Sag 1997), we adopt in this work a more conservative version of HPSG, where the standard word/phrase distinction of sign is retained. In this version, clause types are subtypes of construction that are cross-classified with the word/phrase distinction (cf. Kathol 1995).

A clause is classified in two dimensions, *sentence-mood* and *rootedness*. Three basic sentence moods, *declarative*, *interrogative*, and *imperative* constitute a partition of *mood*, and this partition is cross-classified with rootedness of a clause. Interrogative clauses are further partitioned into *yes/no interrogative* and *wh-interrogative*, and *yes/no interrogative*, in turn, is partitioned into *inv(erted)-yes-no-int(errogative)* and *subord(inate)-yes-no-int(errogative)*.<sup>5</sup> The basic hierarchy that we will assume is shown in (26):

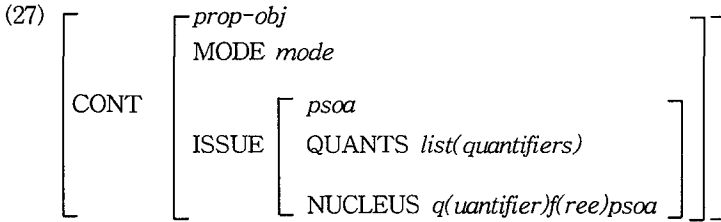


Our assumption is based on Schwarz's analysis of (ii), which, according to him, does not involve gapping, since there is no finite verb missing in the second conjunct. He argues that (ii) contains a missing subject pronouns that is anaphoric to the subject of the first conjunct. (1999 : 365-366)

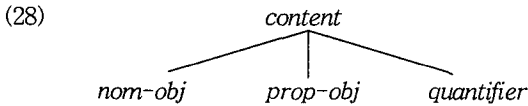
<sup>5</sup>The type *wh-int* also has its subtypes cross-classified with the *rootedness* dimension, which we do not discuss in detail here.

It is important to understand that each type (or subtype) is associated with type-specific constraints, and that for any sort in the hierarchy, constraints associated with that sort are inherited by all of its subsorts. For example, the sort *yes-no-int* will inherit all the constraints associated with *interrog*.

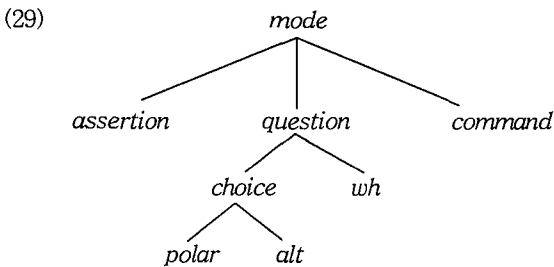
Within HPSG, semantic content of a sign is represented as a value of the *CONT(ENT)* attribute. We assume that the *CONT* value of a sentence is of the sort, *prop(ositional)-obj*, which includes information on the “mode” by which a sentence is interpreted (cf. Yoo 1997):



The old *psoa* in Pollard & Sag (1994) is now a value of the attribute *ISSUE* in the feature geometry in (27), and a new sort *prop(ositional)-obj* replaces the sort *psoa* in the partition of *cont(ent)*:



In (27), the *MODE* value is of the sort, *mode* that is partitioned as in (29):



In (29), the sorts *polar* and *alt* respectively represent the mode in which polar questions and alternative questions are interpreted. The sorts *polar* and *alt* are represented as subsorts of *choice*, in order to reflect the observation that both polar questions and alternative questions involve

choice among a given set of answers. Polar questions concern whether the proposition at hand is true or false, whereas alternative questions provide an option in terms of the phrases conjoined.

We analyze the content of *wh*-questions as a *propositional-object* whose MODE value is *wh* and which has a *wh*-operator in its QUANTS list. Thus the CONTENT of a *wh*-question 'Who sneezed?' can be represented as follows:

$$(30) \left[ \begin{array}{l} \text{prop-ob} \\ \text{MODE } wh \\ \text{ISSUE} \left[ \begin{array}{l} \text{psoa} \\ \text{QUANTS } \langle [1]_2 wh-op \rangle \\ \text{NUC} \left[ \begin{array}{l} \text{sneeze} \\ \text{SNEEZER } [2] \end{array} \right] \end{array} \right] \end{array} \right]$$

For polar questions, the content is of the type, *propositional-object* whose MODE value is *polar*. The following illustrates the CONTENT value of 'Did he sneeze?':

$$(31) \left[ \begin{array}{l} \text{prop-obj} \\ \text{MODE } polar \\ \text{ISSUE} \left[ \begin{array}{l} \text{psoa} \\ \text{QUANTS } < > \\ \text{NUC} \left[ \begin{array}{l} \text{sneeze} \\ \text{SNEEZER } [2] \end{array} \right] \end{array} \right] \end{array} \right]$$

On the other hand, the CONTENT of the alternative question 'Does he like cookies or jelly?' can be analyzed as in (32):

$$(32) \left[ \begin{array}{l} \text{prop-obj} \\ \text{MODE } alt \\ \text{ISSUE} \left[ \begin{array}{l} \text{psoa} \\ \text{QUANTS } \langle alt-op [2]_4 \rangle \\ \text{NUC} \left[ \begin{array}{l} \text{like} \\ \text{LIKER } [3] \\ \text{LIKED } [4] \end{array} \right] \end{array} \right] \end{array} \right]$$

As will be shown in 4.2, we propose that there is an alternative operator for the disjoined phrase, which appears in the QUANTS list in (32).

Since the MODE value can be *wh* if and only if the QUANTS contains a *wh*-operator, we need the following constraint to ensure this:

$$(33) [\text{MODE } wh] \leftrightarrow [\text{QUANTS } <..wh-op..>]$$

Likewise the MODE value can be *alt* if and only if the QUANTS contains an alternative operator. The relevant constraint is as follows:

$$(34) [\text{MODE } alt] \leftrightarrow [\text{QUANTS } <..alt-op..>]$$

As we noted in section 2, matrix yes-no interrogatives in English, whether they are used as polar questions or alternative questions, involve subject-auxiliary inversion, while embedded yes-no interrogatives do not. This fact can be implemented via the INV(ERTED) value of the clause, which is identical to that of the head verb of the clause. This means we need to add the following constraints:

$$(35) inv\text{-}yes/no\text{-}int. \rightarrow [\text{HEAD|INV } +]$$

$$(36) subord\text{-}yes/no\text{-}int. \rightarrow \left[ \begin{array}{l} \text{HEAD|INV } - \\ \text{MARKING } whether \vee if \end{array} \right]$$

In the case of subordinate yes/no interrogatives, we need an additional requirement to guarantee the introduction of *whether* or *if* via the MARKING value stated in (36). For more details see section 5.

#### 4.2. Alternative Operator

It has been widely assumed that a *wh*-question interpretation is obtained by scoping of the interrogative operator associated with the *wh*-phrase. Based on the scoping property of disjunction that we saw in section 3, we assume that an alternative question interpretation in such examples as (37) is assigned by scoping of the alternative operator associated with the disjoined phrase:

$$(37) \text{Does Sandy like cookies or jelly?}$$

In order to represent the operator scope, we will employ Pollard & Sag's (1994) theory of quantification, which is based on Cooper's (1983) quantifier

storage technique.<sup>6</sup>

I propose that when NPs are conjoined by *or*, the conjunction optionally has an alternative operator in its QSTORE. The QSTORE value of the conjunction is inherited into the entire resulting NP, and further into successively larger constituents, and retrieved at an appropriate site in the structure (i.e. at the node whose CONT|ISSUE value is of the sort, *psoa*).

The logical form of the alternative question (37) can be represented as (38), where the bracketed part corresponds to an alternative operator:

$$(38) [\text{alt } x] \text{ cookies}'(x) \vee \text{jelly}'(x) \text{ like}(j, x)$$

The alternative operator originates in the conjunction *or*. The lexical entry of *or* that conjoins constituents whose CONT is of *nominal-object* (normally NPs) can be represented as follows:<sup>7</sup>

(39) *or*

$$\left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \text{conjunction} \\ \text{SPEC} \left\{ \left[ \begin{array}{l} \text{IND } [1] \\ \text{RESTR } [3] \end{array} \right], \dots, \left[ \begin{array}{l} \text{IND } [2] \\ \text{RESTR } [4] \end{array} \right] \right\} \end{array} \right] \\ \text{CONT } [5] \left[ \begin{array}{l} \text{IND } [0] \\ \text{RESTR} \left\{ \left[ \begin{array}{l} \text{or} \\ \text{JUNCTS } \{ [3], \dots, [4] \} \end{array} \right] \right\} \end{array} \right] \\ \text{QSTORE} \left\{ \left( \left[ \begin{array}{l} \text{DET al} \\ \text{RESTIND } [5] \end{array} \right] \right) \right\} \end{array} \right]$$

<sup>6</sup> Pollard & Sag's theory cannot explain scoping of *wh*-operators, and this is remedied in Yoo (1997) and Pollard & Yoo (1998), which provide revised and extended theory of operator scope. Since our discussion of alternative questions in this paper is not directly related with *wh*-operators, we will adopt Pollard & Sag's theory for the sake of simplicity.

<sup>7</sup> We assume that there is another entry of *or* that conjoins two categories whose CONT|ISSUE are of sort *psoa* (i.e. VPs or Ss in usual cases). We posit separate entries in order to account for different combinatorial semantics in each case. While the version of semantics presented in Sag & Wasow (1999) enable them to state the combinatorial semantics of both cases in a single coordination rule, it remains to be worked out how operator scope is represented in such a version of semantics. Moreover, since their rule does not account for the syntactic aspects of NP coordination, a separate coordination rule seems to be in order.

There are a number of points to note here. First we take a conjunction to be a *functional head* so that it can specify the conjunct daughters combined via its SPEC feature. Second, departing from the standard assumption, the SPEC value in (39) is represented as a set of *synsem* objects, rather than just a *synsem* object. Third, for each *synsem* object in the SPEC, its RESTR value appears in the JUNCTS value of the CONT|RESTR set. Fourth, as mentioned above, we assume that an alternative (disjunction) operator optionally appears in the QSTORE of *or*. When a disjoined NP is used in an alternative question, the inheritance and retrieval of the alternative operator results in the alternative question interpretation. Since there is a constraint (34) that the presence of the alternative operator in the QUANTS value is possible only when the CONT of the given clause is [MODE *alt*], it is guaranteed that the entry of *or* containing an alternative operator in its QSTORE is used only when the sentence is interpreted as an alternative question. When the disjoined NP does not include an alternative operator, the question at hand will simply yield a polar question reading.

Following Pollard & Sag (1987, 1994), I assume that coordinate structures in English are unheaded, and consist of multiple conjunct daughters and a conjunction daughter. They are subject to the Coordination Principle in (40).

(40) Coordination Principle (weak version):

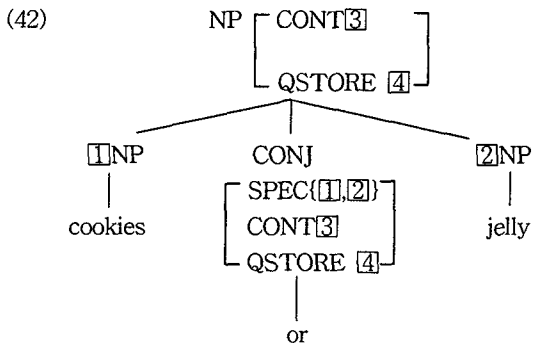
In a coordinate structure, the CATEGORY and NONLOCAL value of each conjunct is subsumed by that of the mother.

Furthermore, I propose that coordinate structure following *immediate dominance* (ID) schema:

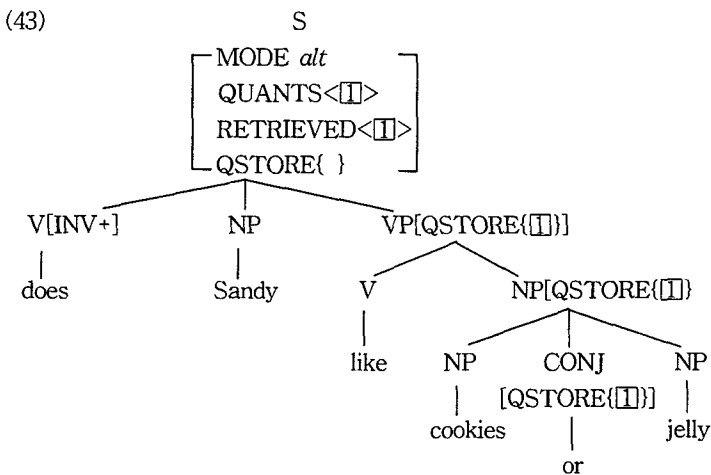
(41) (Schema 8) : a phrase with DTRS value of sort *coordinate-structure*, such that the SPEC value of the conjunction daughter is token-identical to the set of SYNSEM values of the CONUNCT-DTRS value, and whose CONT and QSTORE values are structure-shared with those of the mother, respectively.

Based on the preceding discussion, the NP *cookies or jelly* can be represented as in (42):

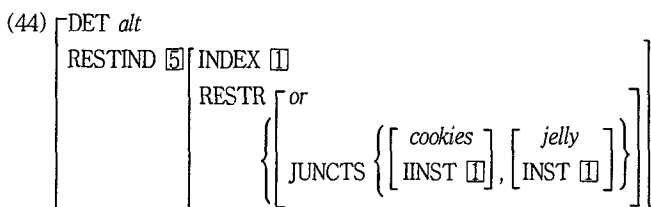




The operator in the QSTORE of the NP in (42) is inherited and retrieved as in (43):

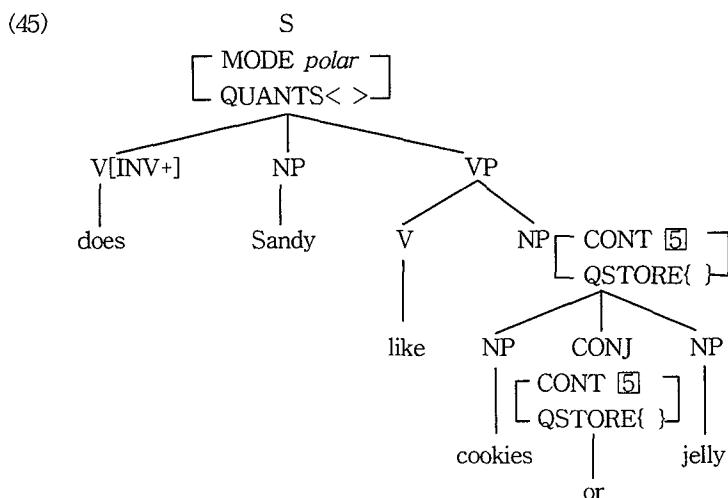


In (43), the operator indicated by  $\square$  represents the description (44):



On the other hand, the given sentence will be interpreted as a polar question, when there is no alternative operator that originates from the

conjunction *or*:



In (45), the tag [5] indicates the RESTIND value [5] in (44). Since *or* in (45) does not have an alternative operator, (45) will only yield polar question reading.

## 5. *Whether* and *If*

In this section, we will examine how to analyze the words *whether* and *if* that introduce embedded yes-no interrogatives. There have been various approaches to *whether*. Traditionally, *whether* is taken to be derived from a complex consisting of *wh(ich)* and *either*. According to this view, yes-no interrogatives are *wh*-questions in disguise. (See Katz & Postal 1964 and Luelsdorff & Norrick 1979 for such view of *whether*.) Another approach to *whether* claims that *whether*, together with *if*, can be treated as a preposition, and further characterized in terms of the WH feature. Emonds (1985) unifies both *if* and *whether* as [P, +WH], whereas Stuurman (1991) proposes that *whether* be [P, +WH] and *if* be [P, 0WH].<sup>8</sup> Attempts to

<sup>8</sup> Stuurman (1991) assumes three possible values of a feature, [+Fi], [0Fi], and [-Fi]. While a negative feature specification stands for incompatibility with the feature, a 0 feature does not impose incompatibility. Thus he assumes that a category specified as [0Fi] may obtain Fi (thus becoming [+Fi]) in specific contexts. According to him, *if* [0WH] is transformed into *if* [+WH] when it is properly governed by a question-

assimilate *whether*-questions to *wh*-questions are made as well in Lasnik & Saito (1992), in which *whether* is assumed to be a [+Wh] phrase in Spec of CP, and observes the *Wh*-criterion. However, to assimilate *whether*-clauses to *wh*-clauses may be problematic. As will be shown below, there are cases where *whether*-clauses do not show the same distribution as *wh*-clauses, and in other cases *whether*-clauses and *if*-clauses do not exhibit the same distribution.

Within the constraint-based grammar, Pollard & Sag (1994) note that it is not clear whether the interrogative *whether* is best treated as a complementizer (thus being a *marker* in P&S's sort hierarchy of *parts of speech*) or as an adjunct. Ginzberg & Sag (1998) treat *whether* and *if* as a complementizer which is a subtype of a verbal category, and assume that the CONTENT of *whether* and *if* is of the type *question*.

I believe that there is some advantage in treating *whether* as a marker. In HPSG, a marker is a functional head which selects its sister via the SPEC feature. The examples of markers include complementizers *that* and *for*, and the comparative words *than* and *as*. Different classes of markers are distinguished by the MARKING values of sort *marking*. The sort *marking* has two subsorts, *marked* and *unmarked*, and the sort *marked* has its subsort *comp(lementizer)* with subsorts of its own, *that* and *for*. Since we will consider *whether* and *if* complementizers, the subsorts of *comp* would include *whether* and *if* as well. In a phrase, a marker does not serve as a head, and the syntactic and semantic information represented via the HEAD and CONTENT values of the phrase comes from the constituent that it combines with. When a phrase has a marker daughter, it inherits the MARKING value from the marker daughter.

One of the reasons that we treat *whether* as a marker is that there are cases where *whether* introduces a clause that is semantically not a question. As Karttunen (1977) observes, dubitative verbs, such as *doubt*, *question* and *be dubious* take *whether*-questions as complements, but do not allow *wh*-questions.

- (46) a. I doubt whether they serve breakfast.
- b. \*I doubt what they serve breakfast.
- c. I doubt that they serve breakfast.

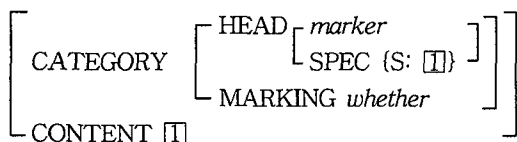
Ginzburg (1992) mentions another two predicates belonging to this class, namely, *be suspicious* and *deny*. Adjectival forms of dubitative verbs, such as *doubtful* and *questionable* seem to exhibit the same pattern. Quirk *et al.* (1985:1053) show that *justify* is another verb that may take a *whether*-clause that is not an indirect question:

(47) You have to justify whether your journey is really necessary.

Karttunen suggests that dubitatives are exceptional to the generalization that verbs which take indirect *wh*-questions as complements also take embedded yes-no (or alternative) questions. However, if we distinguish semantic selection of complements from syntactic subcategorization, the examples (46a) and (47) need not be exceptional in terms of semantic selection of clausal complements. This is because verbs like *doubt* select a declarative, not a question, semantically. In our terms, verbs like *doubt* select a clause which is [MODE *assertion*].

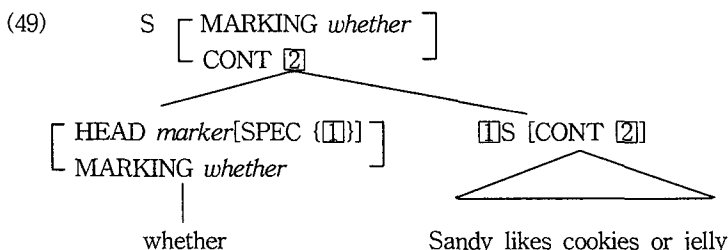
We take the examples such as (46a) and (47) to be evidence suggesting that *whether* is neither a *wh*-word nor a semantically interrogative element. Thus departing from Ginzburg & Sag's analysis that the content of *whether* is of the sort, *question*, we claim that *whether* is semantically vacuous and identifies its CONTENT with that of the clause that it combines with. Accordingly, the LOCAL value of *whether* can be described in (48):

(48) *whether*



The lexical entry of *if* can be given in the same way, with the only difference being the MARKING value *if*.

Accordingly, the embedded clause in (25) can be represented by (49):



The S in (49) can combine with either verbs taking interrogative cosplements or dubitative verbs. The following (50) exemplifies the valence property of the question-taking verb *wonder*, and (51) represents that of *doubt*:

(50) *wonder*

[COMPS <S[*whether*∨*if*, MODE[question]]>]

(51) *doubt*

[COMPS <S[*that*∨*whether*∨*if*, MODE[assertion]]>]

To treat *whether* and *if* as markers also gives a way to state different distribution between *whether* and *if*. Although either *whether* or *if* can appear in many embedded yes-no interrogatives, as in (52), this is not always the case. As Bolinger (1978) observes, depending on the matrix verbs, the use of *if* may be restricted. The following (53)–(55) exemplify this:

(52) I doubt *whether/if* he is innocent.

(53) I wish he could justify *whether/\*if* he actually needed to.

(54) a. They are investigating *whether/\*if* it is true.

b. I was unable to interpret *whether/\*if* it meant right of left.

c. I'm studying *whether/\*if* I should take that line of action.

d. I'm weighing *whether/\*if* I should take that line of action.

(55) a. They were unable to dig out *whether/\*if* it was true.

b. They were unable to unearth *whether/\*if* it was true.

As we suggested above, if we treat *whether* and *if* as markers, and specify MARKING values of the sentential complement for these verbs, then we have a way of describing the contrast in (53)–(55).

## 6. Concluding Remarks

In this paper, I have presented an analysis of English alternative questions that does not involve movement or gapping in its syntactic form. We assumed that alternative questions containing disjoined NPs can be accounted for in terms of a coordination rule that conjoins phrases which

are semantically nominal objects via the conjunction *or*. In the proposed analysis, the alternative question interpretation is obtained by scoping of an alternative operator which originates in the quantifier store of a disjoined NP. Since such an alternative operator is optional for a disjoined NP, when the NP does not contain the operator, the sentence in question receives a polar question interpretation. In order to account for embedded yes-no interrogatives, we examined the distribution of *whether* and *if*, and concluded that these words can be treated as *markers* whose MARKING values can be specified in the subcategorization frame of the verbs taking clausal complements.

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## ABSTRACT

## A Constraint-Based Approach to Alternative Questions in English

Eun-Jung Yoo

This paper deals with alternative questions in English, and proposes an analysis employing an alternative operator. I claim that the alternative question interpretation is not obtained by such syntactic processes as movement or gapping, but by scoping of an alternative operator that originates from the conjunction *or*. Accordingly, while the syntactic forms of alternative questions contain nothing more than a coordinate structure, their semantic component will be analyzed as including an alternative operator. Yes-no interrogatives in English may exhibit ambiguity between an alternative question reading and a polar question reading, and in the proposed analysis, this is accounted for by the optional nature of the alternative operator associated with a disjoined phrase. In representing questions, I provide a 'multiple inheritance' type hierarchy of clauses, in which the relationship between alternative questions and other types of questions is manifested. With respect to embedded alternative questions, this paper also examines the status of the introducing words *whether* and *if*, and argues that their distribution is restricted by matrix verbs.

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서울특별시 관악구 신림동 산 56-1

서울대학교 인문대학 영어영문학과

전자우편: ejyoo@snu.ac.kr